

**pci Wood Mackenzie**  
A Verisk Analytics Business

**IFAI – Outlook 2016**


**Oil and Natural Gas: Impact on Synthetic Fibers**  
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## Agenda

1. Introduction
2. Oil & Gas
3. Impact on Fibers
4. Total Fibers Market
5. Industrial Filament & Markets

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## PCI Update

### Verisk Analytics, Inc., Acquires The PCI Group - Nov 20 2015

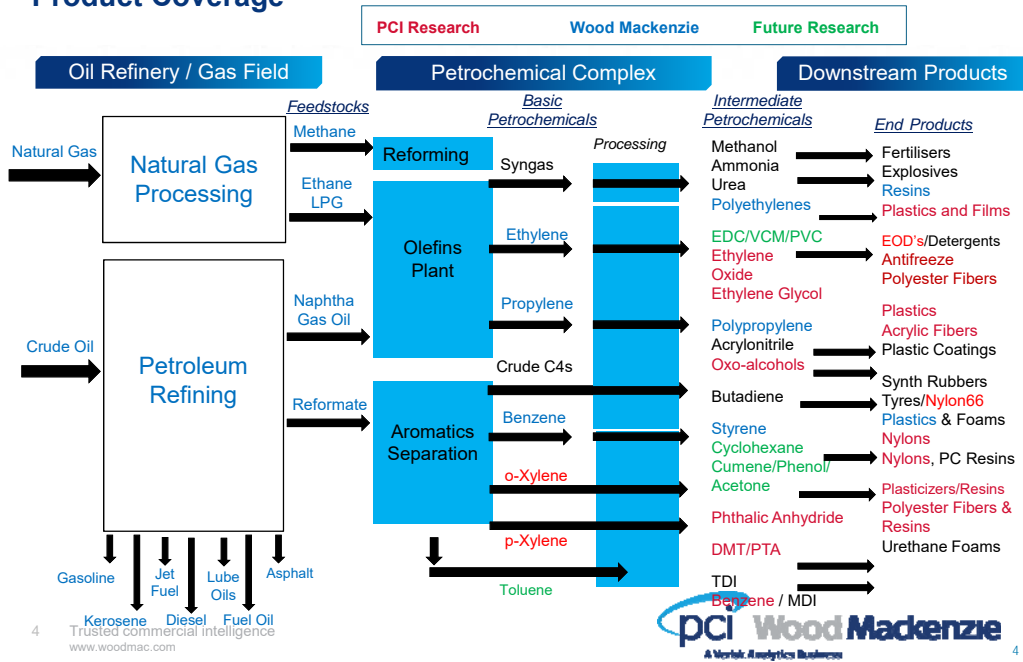
Acquisition of PCI will create an industry-leading chemicals business at Verisk's Wood Mackenzie.

Verisk Analytics, is a New Jersey based company providing risk assessment and data analytics services to a variety of industries. 2014 revenues of \$1.75 billion and over 6,000 full time people.

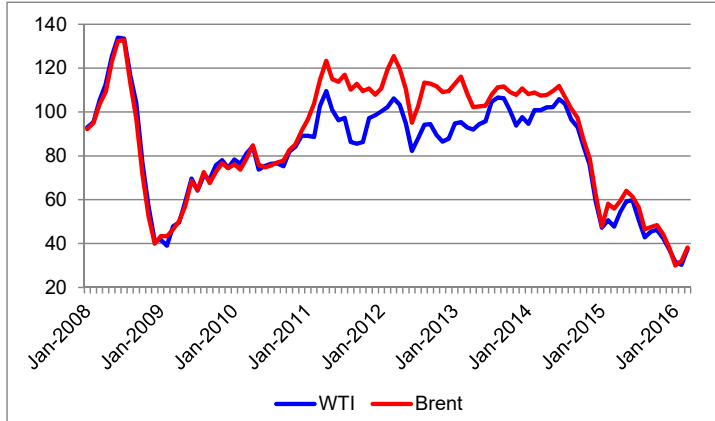
In Q1 2015 Verisk bought Wood Mackenzie, an Edinburgh, Scotland company est. in 1844. Wood Mackenzie developed an oil and energy business in 1973 and have built on that to become a global leader in commercial intelligence for the energy, metals and mining industries.

The PCI Group and its associates are now a part of Wood Mackenzie in an additive and complimentary function bringing downstream expertise through the supply chain across petrochemicals, xylenes and polyesters, resins, nylons and fibres, and films.

## Product Coverage

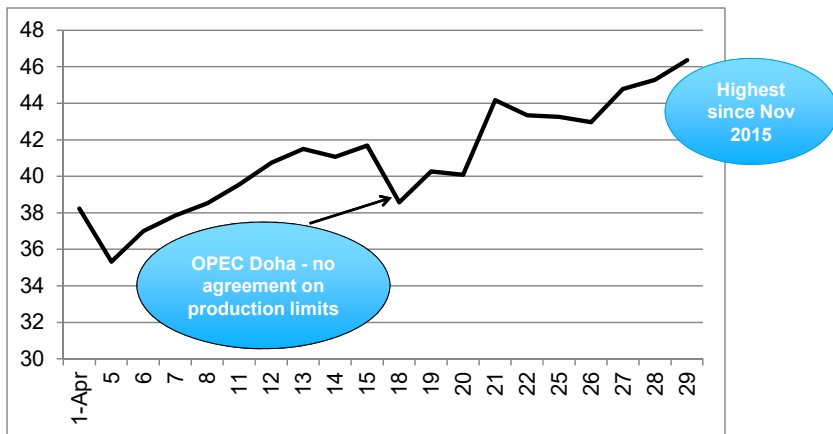


### Oil Prices \$/barrel



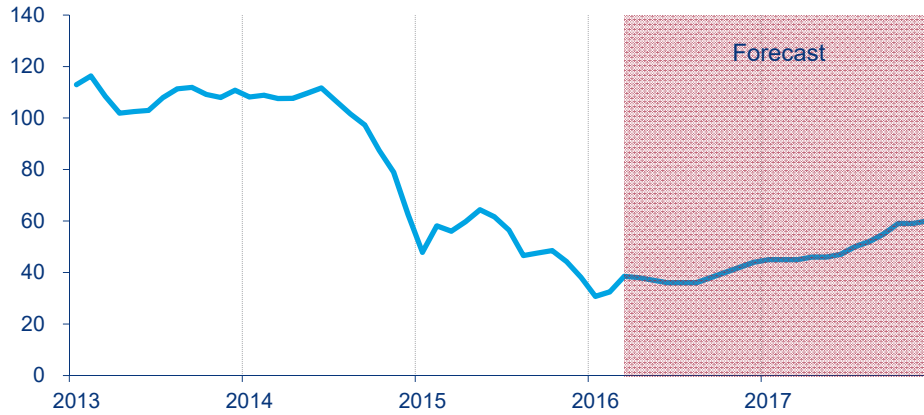
**Oil Prices are Global. Brent & WTI expected to remain close.**

### Daily WTI Oil Prices – April 2016, \$/barrel



**Unlikely to see significant price appreciation until market sentiment finds a positive price catalyst**

Brent price outlook (US\$/bbl)



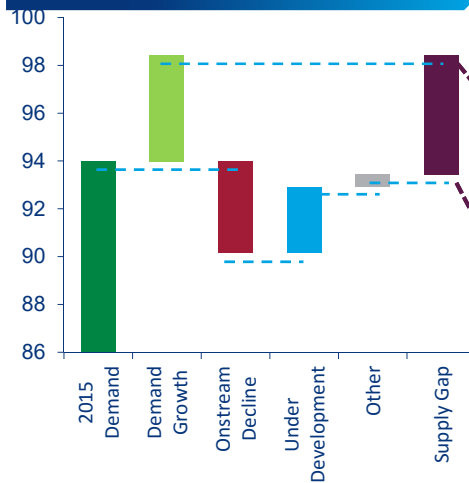
Source: History - Argus; Forecast - Wood Mackenzie  
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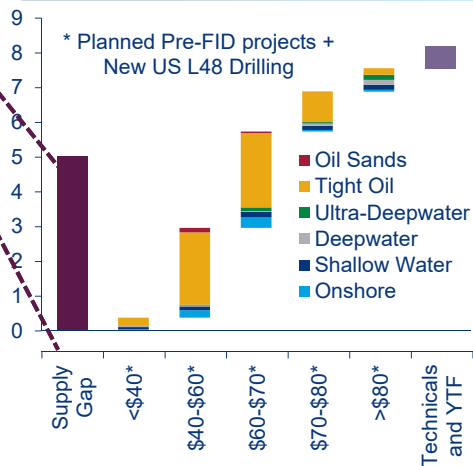
**Need about 5 million b/d of new supply by 2020 to meet demand**

Prices of at least \$60-\$70/bbl needed to support necessary supply

2020 supply gap (mb/d)



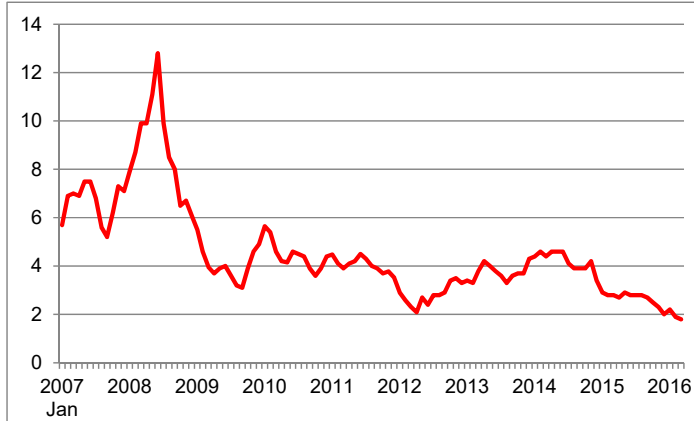
Potential 2020 supply by breakeven tranche & asset type (mb/d)



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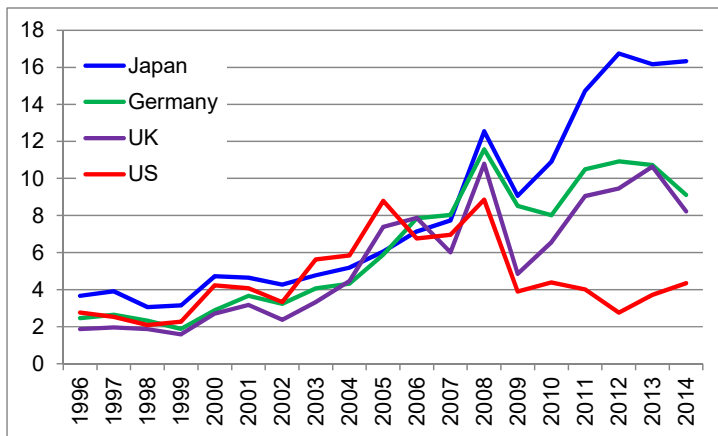


### Natural Gas Prices – USA \$/mm btus



Natural Gas prices are Regional. US to keep significant advantage.

### Natural Gas Prices \$/mm Btus



2015 US avg. \$2.67

Source: BP

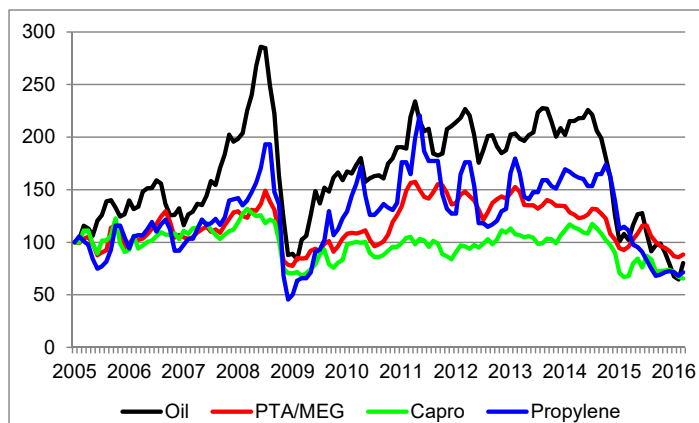
## Energy Overview

- Crude markets are poised for a rebound. Capital expenditures have fallen, keeping the production outlook constrained. Breakeven economics for those plays that are still viable will likely require crude above the \$60-\$70 range.
- Gas markets will continue to be range-bound near \$3-\$4 per MMBTU in North America for the next several years. Significant expansions in consumption still cannot overtake the huge, cheaply available inventory of gas reserves.
- What does this mean for fibers? When there are no supply demand constraints in petrochemicals then oil is going to be the leading price driver – but not on a one for one basis.

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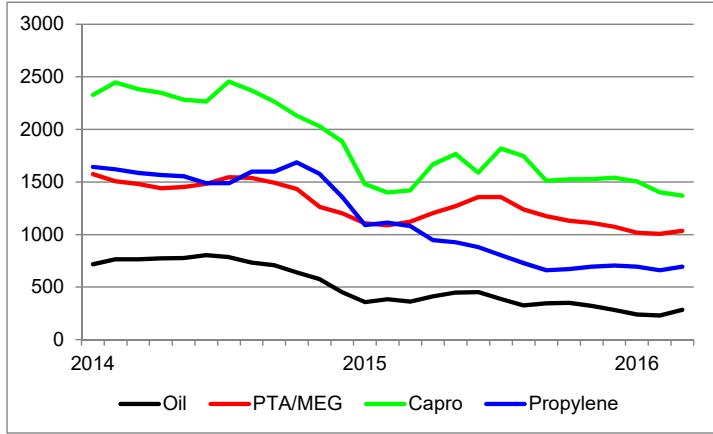
## Oil to US Raw Materials – Indexed to Jan 2005



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### Oil to US Raw Materials – \$/ton



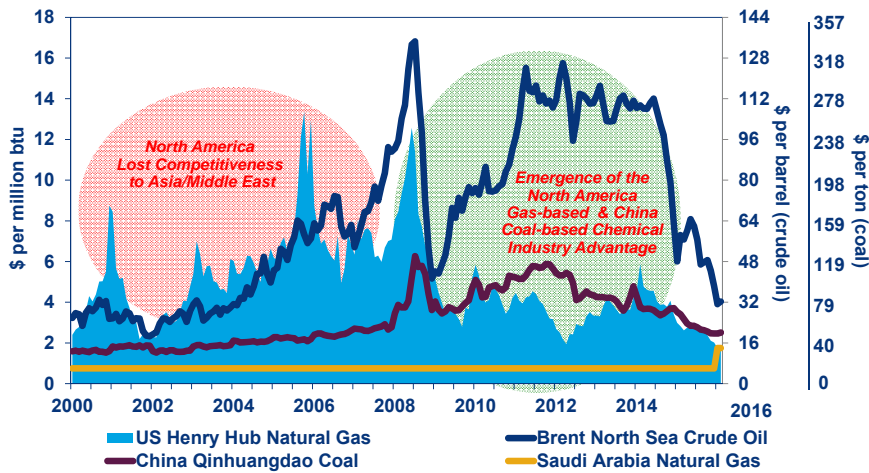
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### Ethylene - The Gas & Coal Based Chemical Renaissance

The “rollercoaster” of volatility of regional energy valuations drives investment decisions across the chemical industry

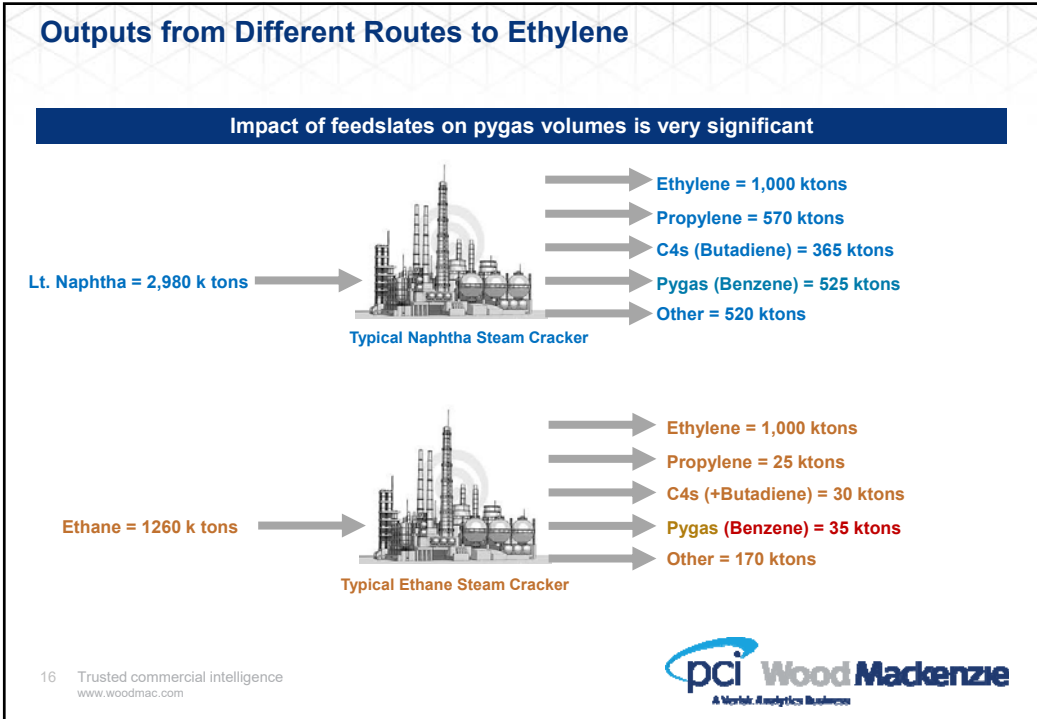
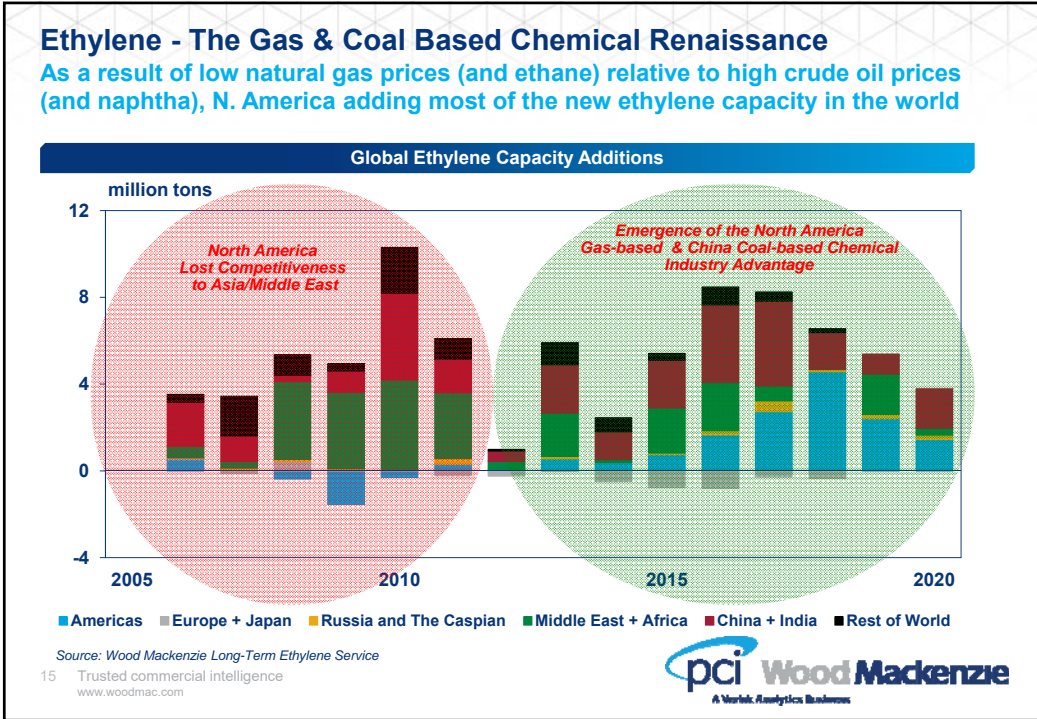
#### Key Global Energy Benchmarks



Source: ArgusMedia, NYMEX, SXCoal

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## Polyester - US Competitiveness Change?

A new scenario is developing in the US, partly as a result of lower cost petrochemicals, which is moving the US into a potential overcapacity which will rely on exports to keep plants operational. (Just like China!)

Polyester raw materials are PTA and MEG (0.86 + 0.35 approximately). PTA production in US has been in hands of BP and DAK. BP has sold 1 of its 2 US plants to Indorama and the Italian company M&G is building a 1.2 million ton PTA plant to partially feed its new PET resin plant. Indorama has also bought the only PTA plant in Canada.

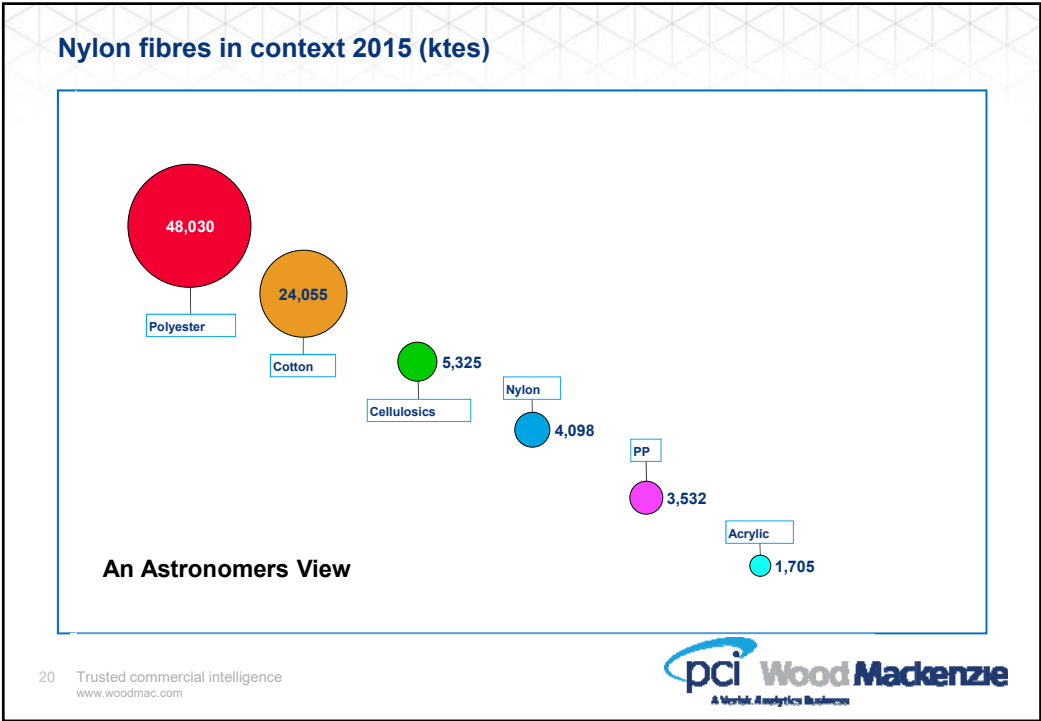
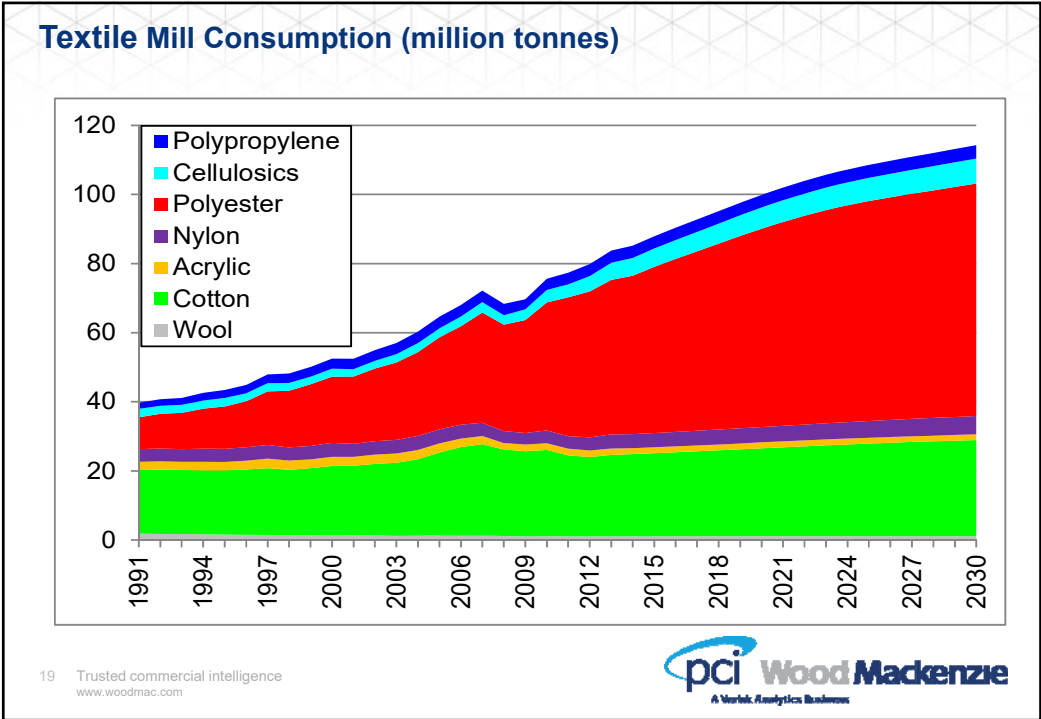
MEG: Because of US cheap Natural Gas, the US becomes the world's low cost producer of MEG and from 2018 to 2020 has 3 million tons of new capacity projects. US demand forecast to increase 500,000 tons. The US has to become a major exporter, and therefore has to price below Asian levels to compete.

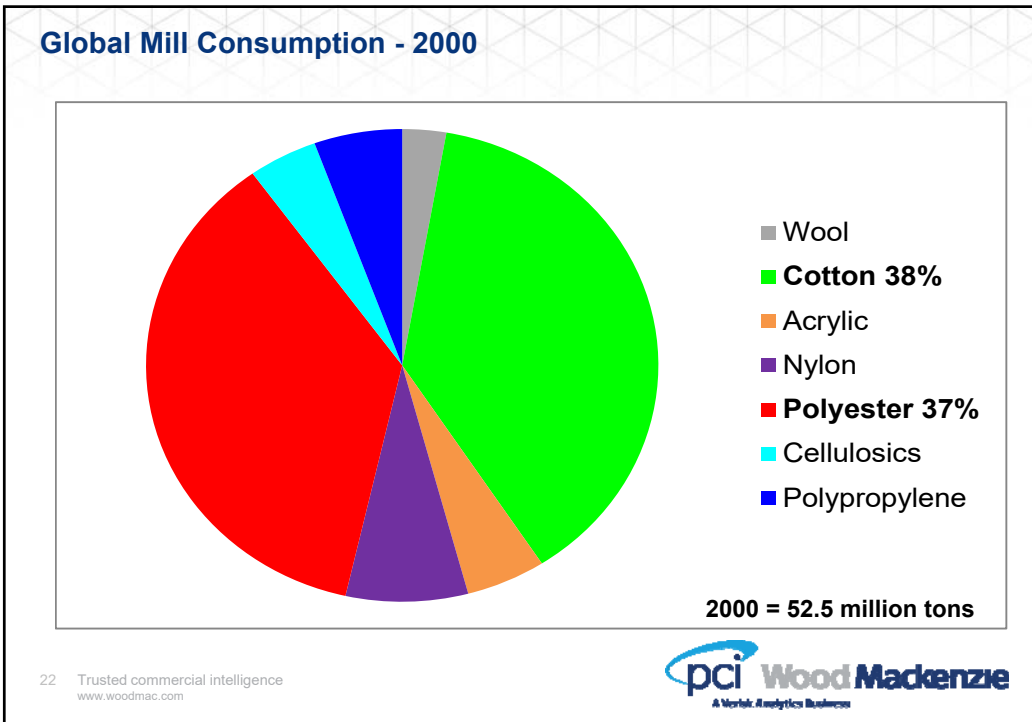
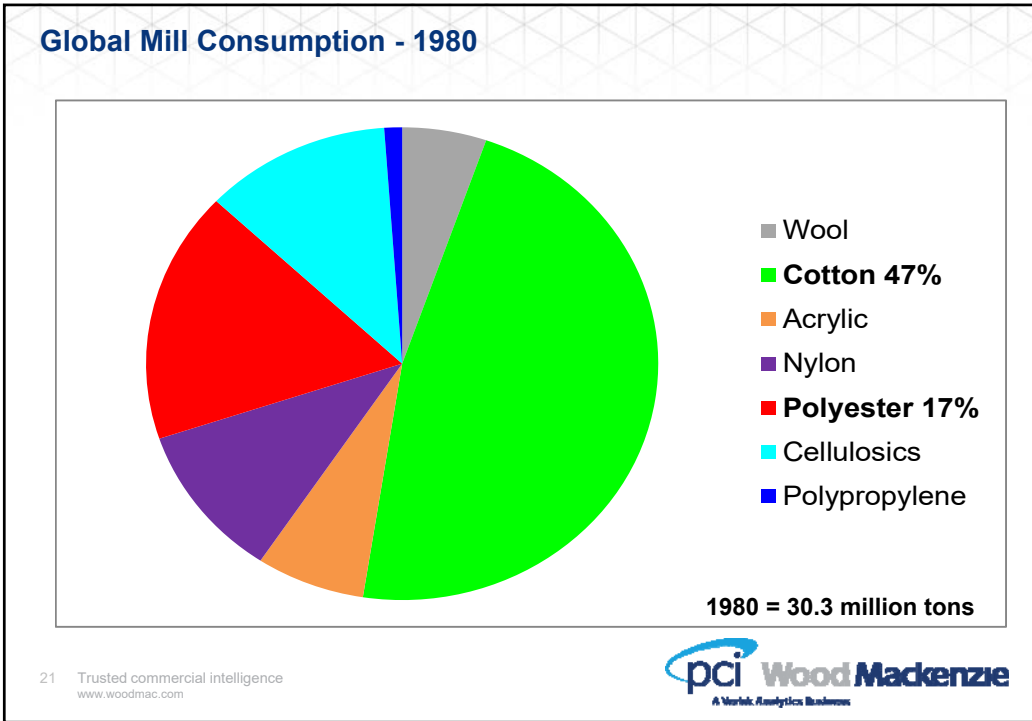
## Polypropylene - US Competitiveness Change?

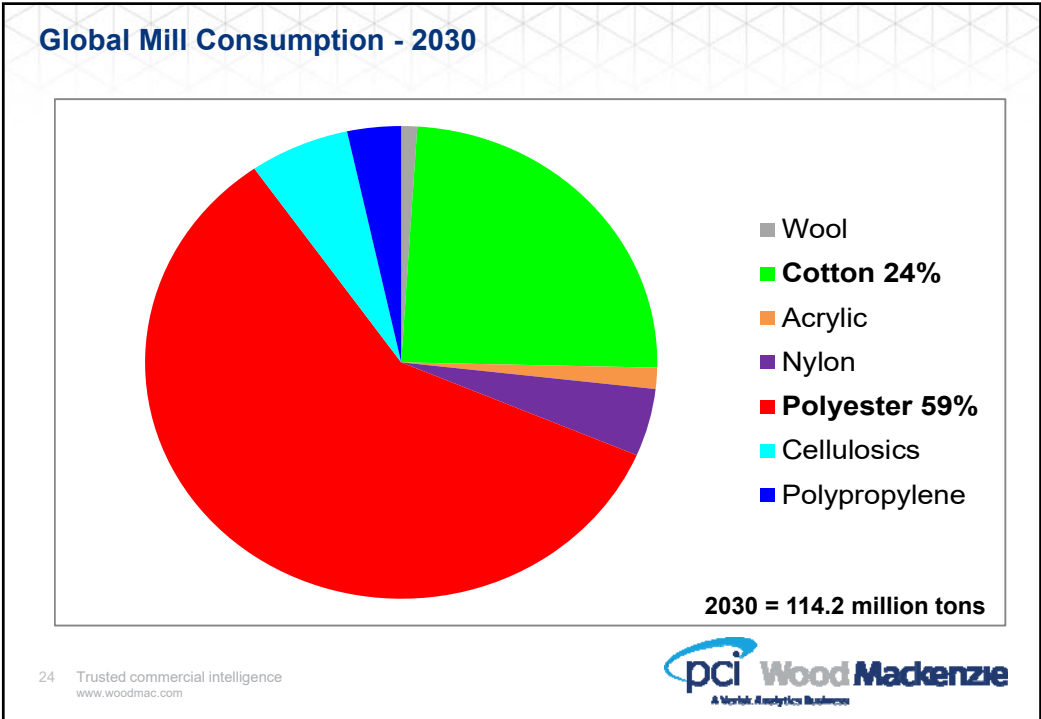
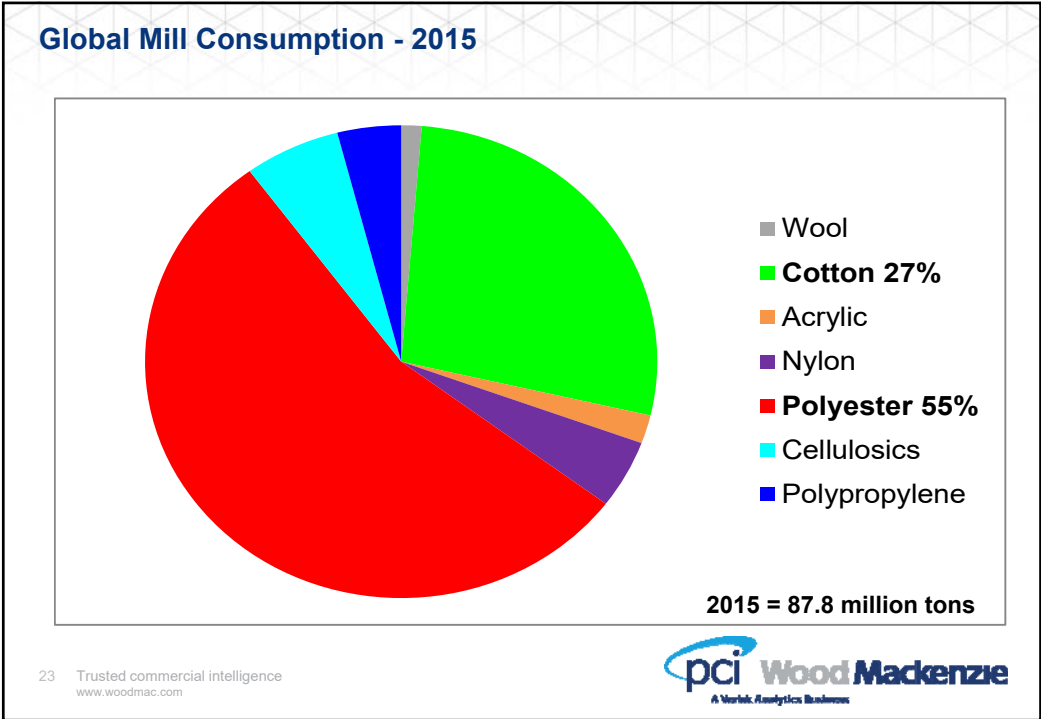
The scenario that helps Polyester (MEG) become more competitive hurts Propylene.

MEG comes from ethane production and Natural Gas is the most cost efficient route in the US, whereas Propylene is generally a by product from Naphtha (oil). Due to low cost Natural Gas in the US (regional pricing) there is a major expansion into natural gas cracking and this is producing much less propylene.

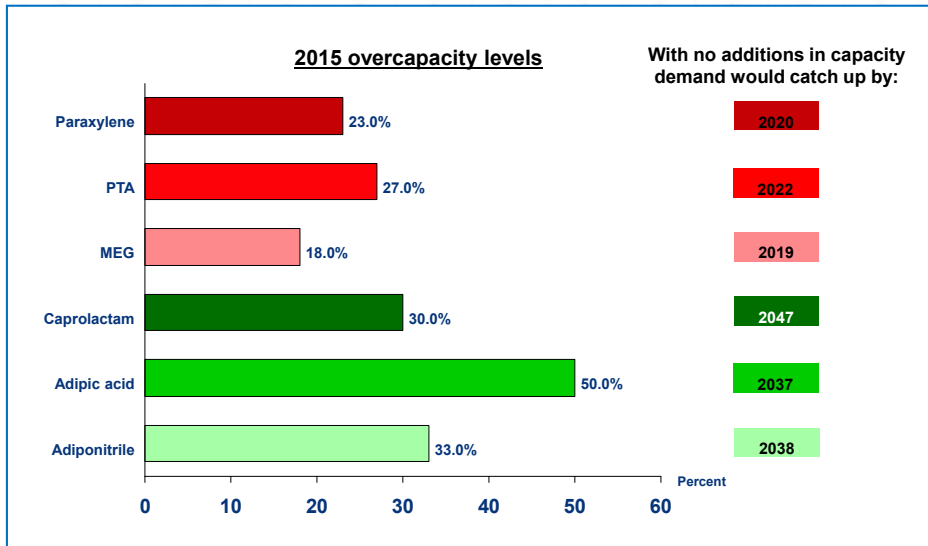
This is leading to investments in on purpose propylene







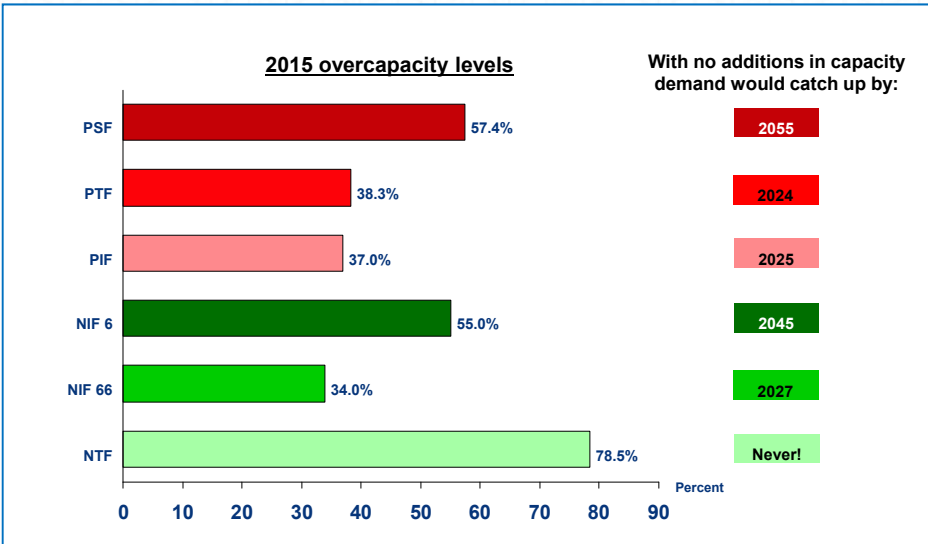
### Overcapacity in synthetic raw materials 2015



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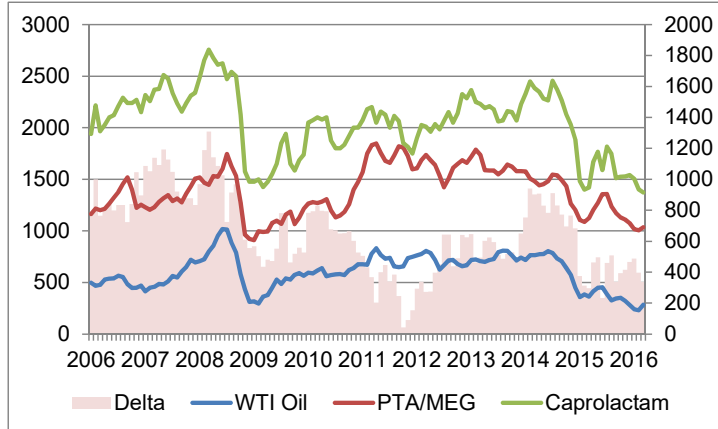
### Overcapacity in synthetic fibre chains 2015



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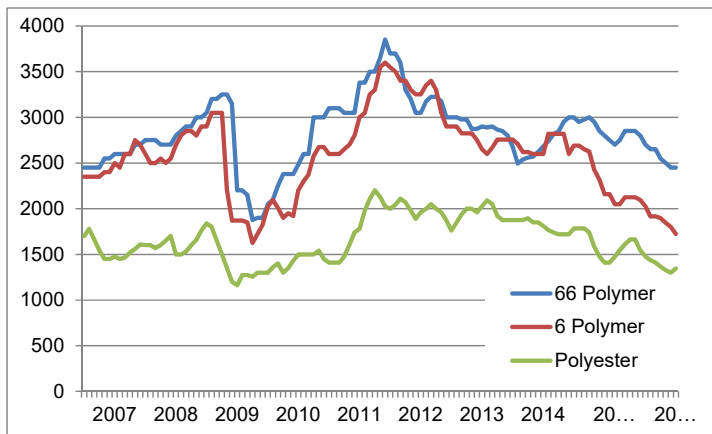
### Nylon 6 and Polyester US Raw Materials Comparison (\$/ton)



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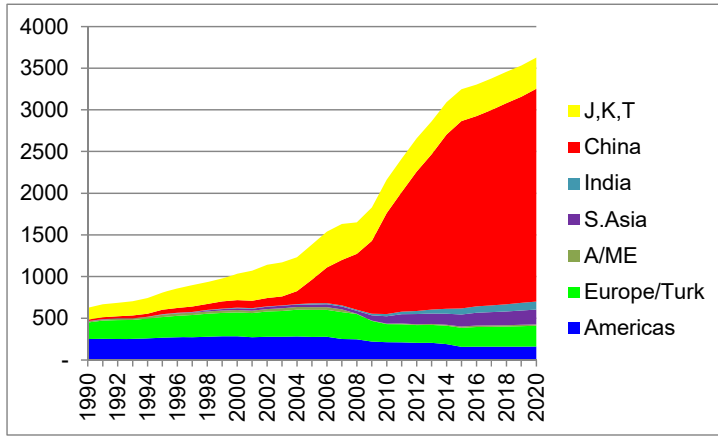
### Nylon Polymer v Polyester – US Prices per ton



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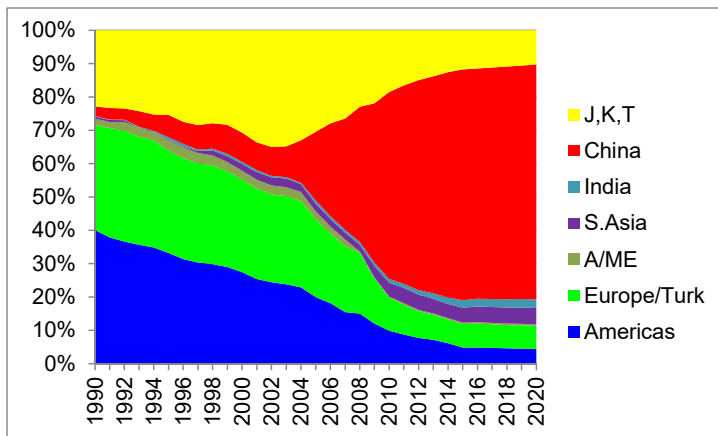
### Polyester Industrial Filament Capacities (000 tons) – High Tenacity



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### Polyester Industrial Filament Capacities (% Share) – High Tenacity

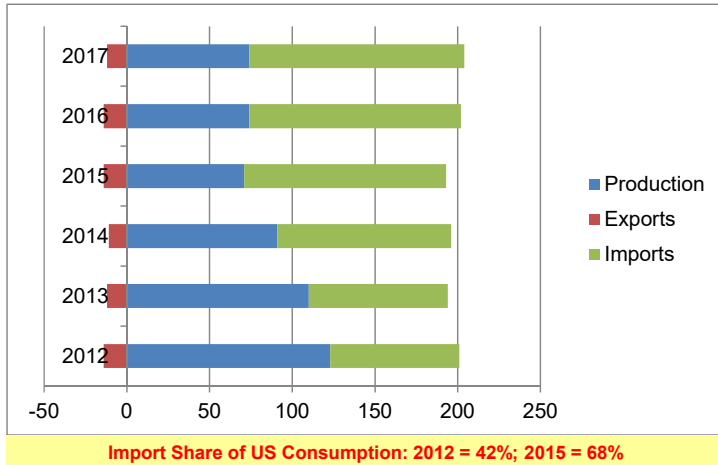


China has 70% of Global Capacity in 2015

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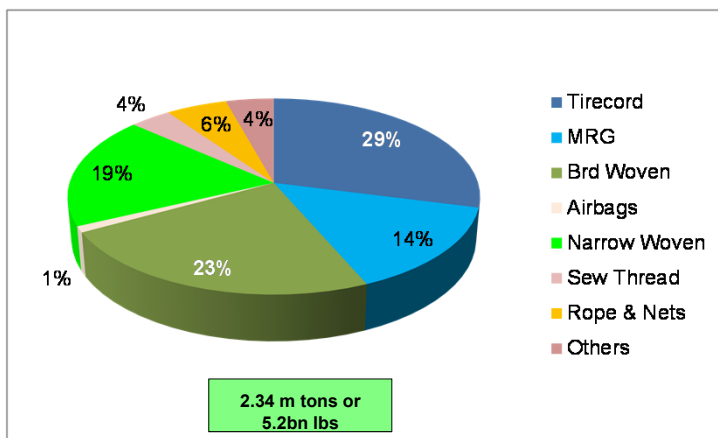
### Polyester Industrial Filament US Production & Trade (000 tons)



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### Polyester Industrial Filament Segmentation (2015) – High Tenacity

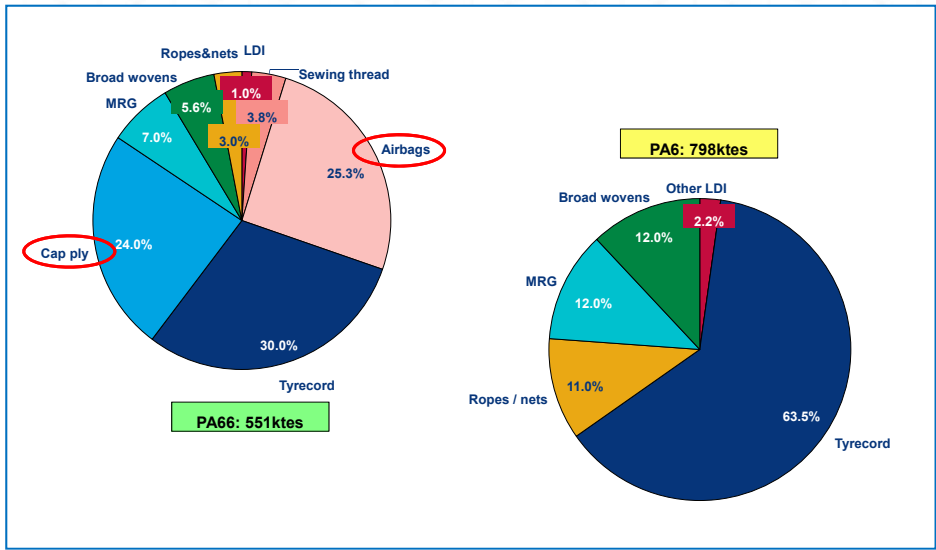


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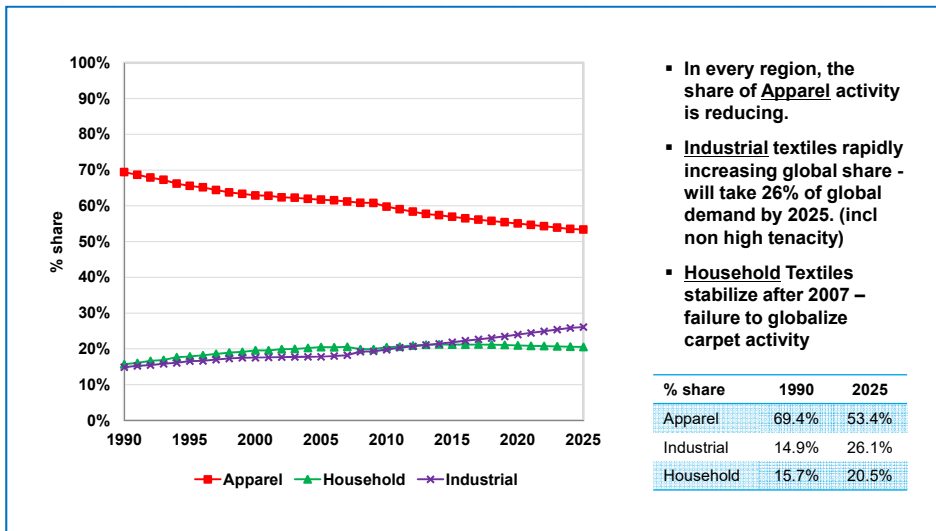
### Nylon Industrial Filament segmentation (2015) – High Tenacity



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### End-use mix - % Share global fibres activity 1990-2025

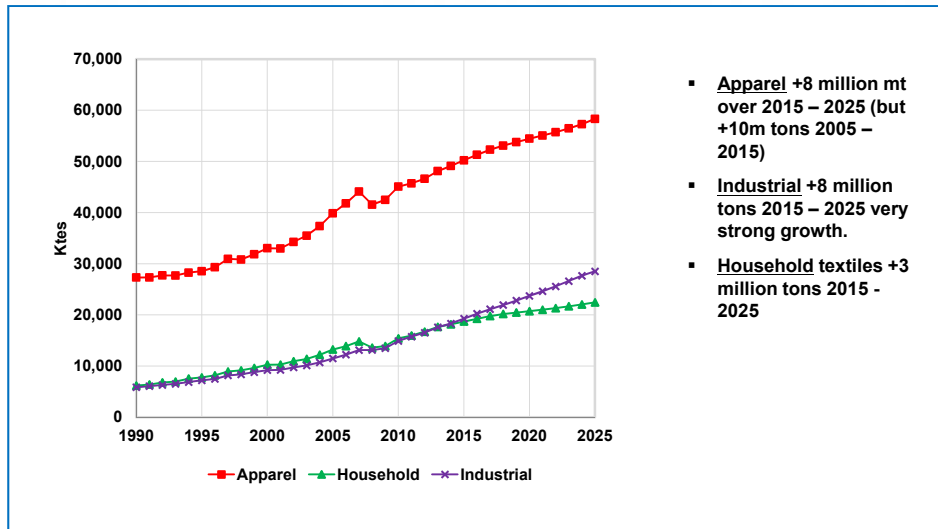


- In every region, the share of **Apparel** activity is reducing.
- **Industrial textiles** rapidly increasing global share - will take 26% of global demand by 2025. (incl non high tenacity)
- **Household Textiles** stabilize after 2007 – failure to globalize carpet activity

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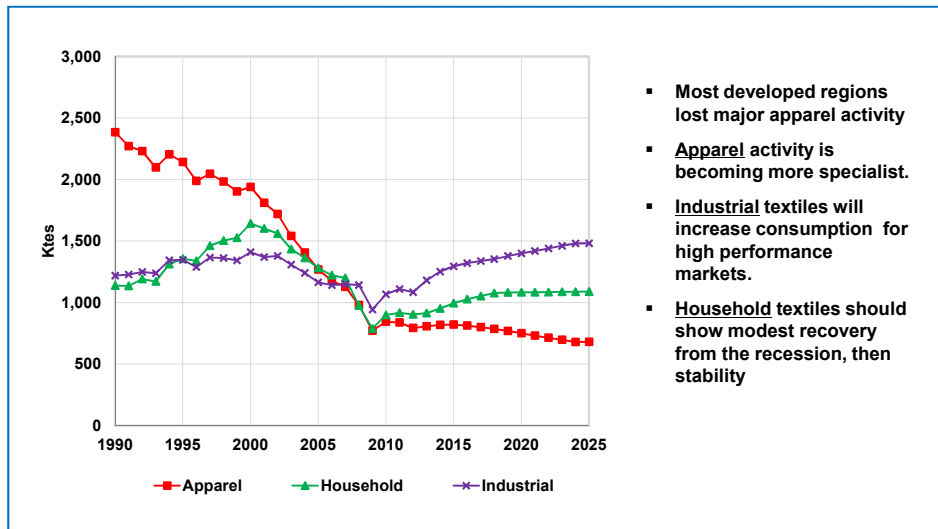


### End-use mix - Volume global fibres activity 1990-2025



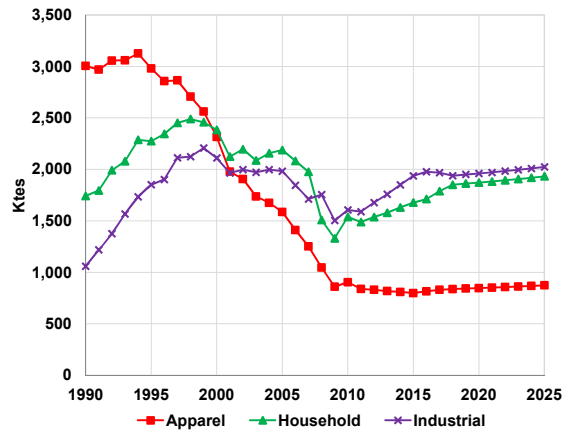
- **Apparel** +8 million mt over 2015 – 2025 (but +10m tons 2005 – 2015)
- **Industrial** +8 million tons 2015 – 2025 very strong growth.
- **Household textiles** +3 million tons 2015 - 2025

### West Europe mill consumption end-use mix



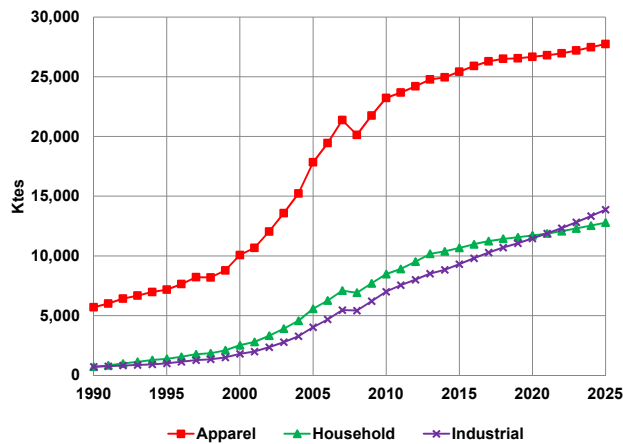
- Most developed regions lost major apparel activity
- **Apparel** activity is becoming more specialist.
- **Industrial** textiles will increase consumption for high performance markets.
- **Household** textiles should show modest recovery from the recession, then stability

### North America mill consumption end-use mix



- North America shows huge mix changes:
- Apparel mill cons fell heavily after 1995 but we see stabilization of all fibers demand 2015 – 2025. CAFTA
- Industrial textiles are still resilient and higher tech systems are emerging
- Household textiles show recovery after 2008 with slow household recovery and carpet use.

### China mill consumption end-use mix



- In China we expect slowing Apparel volume growth but upgrading of the value as China goes up-market.
- Industrial textiles continue powerful growth for domestic infrastructure, automotive and export.
- Household textiles show slower growth in China

## Conclusions

**Oil prices to increase over coming 2 years, but not to spike to recent levels (Middle East conflicts permitting)**

**Natural Gas a major benefit to US industry and Petrochem – 2019/20**

**Polyester continues to dominate; Industrial textiles growth rates higher than apparel or household textiles.**

**Eco issues a very serious threat to plastics and synthetic fibers – microfiber pollution becoming an increasing issue.**

# THANKS

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